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FINAL REPORT

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By

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Throughout my tenure in Iraq, I have been a staff member of the Water Resources Division, USOM., and assigned to the Iraq Ministry of Agriculture, Irrigation Directorate, as a Drainage Engineering Advisor. From the very beginning and until soon after the Revolution which occurred on July 14, 1958, the Director General of Irrigation was Anwar Al Hassani, an American educated Iraqi engineer. Sayed Anwar was relieved of his duties soon after the revolution, after having served in this capacity approximately three and one half years. This length of service exceeded that of any other Director General of Irrigation. Following Sayed Anwar's release, the new government appointed as his successor, Hussain Safar, likewise an American educated Iraqi engineer. Shortly thereafter, Sayed Hussain was succeeded by Dr. Bakir K. El Ghita, who is the present Director General. It is interesting to note that Dr. Bakir also received his engineering education in the United States. I mention these facts merely to indicate the respect which both the former and present governments in Iraq, apparently have for the American educational system and especially for the professional training available in the various fields of engineering. I oftentimes feel that the so-called frustrations of the American Point 4 Technicians in attempting to make accomplishments in Iraq, are small indeed in comparison to the headaches inherited by the Director Generals.

Soon after my arrival in Baghdad on August 13, 1955, I found myself busily engaged in organizing a program of detail drainage investigations of lands in Iraq. I was confronted with the task of completely planning and organizing this program in such a way which would result in the Board of Development delegating the Irrigation Directorate to carry out such a program and providing the Directorate with means to do so. Beginning in November 1955, but preceded by many other meetings, members of the Tansiq Committee, of which I was one, discussed this subject at its regular meeting every two weeks. Rather exhaustive reports were submitted by representatives from both the Board and the Directorate, in an effort to determine which agency should be entrusted with drainage investigations. On April 24, 1956 the Board approved the Irrigation Directorate's proposal for such investigations, and allocated to the Directorate a sum of ID 202,000/-. This sum was to defray all cost for the first two years. The proposal, as approved, was for a 10 year period and envisaged a detailed drainage study of ten areas, totalling 3,000,000 mesharas of land. Printed and bound copies of this proposal, as approved by the Board, are on file in the Irrigation Directorate and the Development Board as well. The Board's approval of this proposal, culminated several years of dispute between the First Technical Section of the Board and the Irrigation Directorate, as to who would carry out drainage investigat

Although this action on part of the Board occurred on April 24, 1956 it was not until several months later that we in the Irrigation Directorate were officially notified, and therefore in a position to go ahead and expend funds for whatever purposes necessary. I immediately made requisitions for both personnel and equipment. Administrative differences of opinion among officials in the various branches of the Iraq Government, as to how the money would be spent, resulted in altogether too long delays in securing both personnel and equipment. I was fortunate, however, in securing an American educated young Iraqi Engineer whom I designated as my principal assistant.

The schedule of work as contained in the proposals gave first priority to the Rumaitha and Shattra Areas, each containing about 300,000 mesharas.

In December 1956, we started our investigations in the Rumaitha area. We did so with the aid of surveyors borrowed from the MSLD. This did not prove satisfactory, and as a result, the greater part of the work in the Rumaitha area was closed down in March 1957. In the meantime, however, we were successful in having surveyed and benchmarked approximately one township, and in installing approximately 50 ground water observation wells. It has been difficult, but I believe I have been successful in educating the Iraqis to the fact that land surveys, bench marks, observation wells, etc. are only the tools of drainage investigations. The design and ultimate success of drainage works depends upon the interpretation of data thereby obtained.

RUMAITHA AREA

The Rumaitha investigations have been divided into two phases, which include the field phase and the office phase. The field phase has consisted of mapping the area by means of a cadastral survey, the establishment of section corners, logging and constructing ground water observation wells, the collection of earth samples from borings made for land classification purposes, collection of ground water samples, field tests for soil permeability determinations, reading of observation wells, field observations for land classification purposes, etc. The office phase has consisted of evaluating and analyzing all field and laboratory data as required for final design purposes, and administering the program as a whole.

A large part of the field work required for the Rumaitha studies has been completed. The first annual cycle of ground water observations will be completed in September of 1959. All wells are read monthly. Office interpretation of field data is now in progress and it is anticipated that final design of the over-all drainage system could be completed by the end of this year. An aerial mosaic of the area was recently completed on a scale of 1:20,000. During the construction of this mosaic, by American Technicians, all efforts were made to impress upon the Iraqi engineers and classifiers, the importance of utilising aerial photos in their work.

Since September, 1956, office activities in regard to these studies have been handicapped by the shortage of office personnel and by the failure of field personnel in forwarding data to Baghdad. Some of the field records vital to the drainage phase of the over-all studies were either lost or misplaced. They are not available for the final interpretation of the studies. Furthermore, certain of the field employees have disregarded the advice given them in regard to the techniques of certain field operation. During recent months, a number of the field records have reached Baghdad written in Arabic.

In spite of the above mentioned difficulties however, considerable progress has been made. Approximately two hundred and twenty wells have been installed for ground water observation purposes, completing this phase of the study. These wells were drilled by hand auger and cased with one and one-half inch galvanized pipe, the lower eighteen inches of which is perforated and surrounded by a suitable gravel pack. Depths of these wells range from about two to five meters below the ground surface. An examination of the well logs as related with other data obtained during the construction of the wells, and, the type of well construction, all indicate that the ground water observations obtained from these wells are representative of true water table conditions. For the purpose of economy, these wells have been installed as combination ground water observation wells and concrete bench marks as well. In so doing, we have established a permanent grid of observation wells in addition to section corner bench marks throughout the area. The bench marks will be available to serve many other useful purposes, such as highway and railroad locations, land ownership, providing datum for the construction of irrigation and drainage projects, etc. It may also be noted that the entire Rumaitha area, comprising about 300,000 meshares, has been subdivided into Townships, Ranges and Sections. Each section consists of four square kilometers and there are twenty five sections to each township. In addition to providing information for these studies, the cadastral survey of the Rumaitha area may also be used in carrying out the provisions of the Agrarian Land Reform Act which has recently been enacted. In fact, a properly executed land survey is the first requirement in the successful execution of such a program. Without such, a proper distribution of the lands would be most difficult. A land classification of the areas involved is equally important. Both types of surveys are included as part of the Rumaitha studies.

Approximately 582 land classification borings have been completed. From these borings and from the observation wells, about 6,000 samples of earth materials have been obtained and sent to the Directorate's Laboratory in Baghdad for specific chemical and physical analyses necessary for drainag and land classification investigations. All laboratory work in this regard has been completed.

Following completion of installing ground water observation wells in August of 1956, a systematic scheme of making ground water observations was undertaken. Since that time, monthly water table contour maps have been prepared based upon these observations. Maps of this type are essentia in the proper evaluation of natural conditions of sub-surface drainage, upon

which the final design of farm drainage facilities, as well as major drainage facilities are largely dependent. Copies of these maps are now on file in the Irrigation Directorate and include all months from September 1958 to date. I feel that USOM should take a bit of pride in knowing that these maps are probably the first of their kind properly prepared for any large area in Iraq. While other maps of a similar nature have been printed and made available for distribution, they have been based upon data obtained from a few widely scattered and uncased borings, or pits, which do not always reflect true water table conditions. Furthermore, the borings or pits, were not located on a predetermined grid system and as a result, the horizontal and vertical controls are always subject to question.

Stratigraphic profiles, or cross sections showing sub-surface materials, have been, and are being constructed in both north-south and east-west directions throughout the area. At periodic intervals, water table profiles are likewise being plotted on these profiles to illustrate the movement of ground water in relation to the sub-surface materials. Most of these profiles have been completed. There now exist facilities in the Rumaitha area to continue these observations in view of the permanent system of observation wells and bench marks. The continuation of these observations until a complete year's record has been obtained, is of utmost importance. This will be completed in September, 1959. This is one of the accepted methods by which the drainage requirement of the area can be determined.

It might be interesting to point out some of the conditions affecting drainage in the Rumaitha area as shown by the September 1958 water table contour map. An examination of this map reveals several interesting facts and also illustrates the accuracy in which the grid of wells has been installed. The Rumaitha area has a gentle slope to the southeast of approximately 12 centimeters per kilometer. Under normal conditions, one would expect the direction of ground water movement would closely approximate that of the ground surface. The map clearly indicates however, that while the direction of ground water flow is generally in a southeasterly direction, there are many exceptions in this regard. There are ground water troughs, mounds and ground water synclines, or depressions. Actually, this is usually true of any irrigated area in the semi-arid or arid parts of the world. This map only indicates the conditions for one particular month of the year, September, and it is therefore necessary that periodic ground water observations be continued in order to obtain the required one year cycle. One particular feature which has been noted in regard to the September water table contour map is a rather lengthly ground water mound which traverses most of the western-central part of the area in a northerly direction. The trend of this mound closely follows that of a main irrigation canal serving the Rumaitha area. The water table contours clearly indicate that this condition of a high water table existing in this part of the area is partly the result of seepage from the canal, and from adjacent rice areas. Drainage problems of this type are oftentimes corrected

by interceptor drains. On the other hand, the map clearly indicates that the remaining irrigation canals in the area were not contributing seriously to the drainage problem during this particular month.

In the southwestern part of the area, as likewise shown on the September 1958 water table contour map, there appeared a ground water trough. The same map also indicated that during September, when the Euphrates is actually contributing to the drainage problem in the Rumaitha area, the movement of ground-water in this general vicinity of the area is to the northwest, where apparently a natural sub-surface drainage outlet exists. The map also indicates that during September, the Euphrates River throughout the rest of it's course in the Rumaitha area was actually acting as a drain and was not contributing to the drainage problem.

In addition to the above, the map also indicated many other hydrological conditions which affect the drainage of lands and which must be considered when planning an over-all system to adequately drain the area.

Depth-to-water maps have also been prepared for the area on a monthly basis since September 1958. The September map of this kind showed that the depth to the water table varied throughout the Rumaitha area from zero to five meters in depth below the ground surface. Those areas in which the water table was either at or near the surface during that month, were planted chiefly to rice. The very nature of rice cultivation oftentimes results in serious drainage problems. This particular crop should only be grown on lands especially suited for this purpose. When grown in close proximity to other crops having entirely different water requirements and cropping characteristics, relative serious drainage problems oftentimes occur. This was clearly indicated on the September 1958 Depth to Water maps and the Iraqis have been giving close consideration to this fact during the past few months.

Ground water table contour maps and depth to water maps have been prepared for each month during the period September 1958 to date. Preparation of these maps will continue through September 1959. Pending the preparation of the final report on the Rumaitha Project, a considerable amount of land classification field data has been collected. All soil horizons up to a depth of from three to five meters were sampled at 802 locations. These samples were sent to the Irrigation Directorate's soil laboratory in Baghdad where routine tests on all samples as far as pH and electrical conductivity (EC x 10^3) on the saturated soil paste, and permeability on the disturbed soil were made. A very large percentage of the samples had a mechanical analyses for texture and were analyzed for gypsum and lime percentage, soluble and exchangeable sodium, and soluble calcium plus magnesium. Pump-out tests were conducted on about 450 of the auger holes to determine average permeability of the soils below the water table.

Although aerial photos were available, the field employees did not make use of them in locating observation wells and other land classification sampling sites. Some progress is now being made by the well readers in locating the wells on the photos. Likewise, up to the present time, the field employees have not made use of the photos and laboratory data to delineate

areas having the same general characteristics such as elevated lands too high to irrigate by gravity, conditions of salinity, water logged depressions, drainability and land use. A study of the irrigation water supply, including the average annual requirement and the monthly distribution there-of under present conditions, has a definite bearing upon the design of adequate drainage facilities. This also has a definite bearing on the leachability of the soils and potential danger of the existing salt in the sub-soil rising to the surface, thereby reducing crop yields. Studies in this regard are being handicapped by lack of available data.

A quick glance at the laboratory data indicates that about one third of the soils sampled show no harmful concentrations of soluble salts in either the surface or sub-soil horizons. These sites are scattered throughout the project area with a slight predominance appearing in the undefined rice areas where apparently water tables remain high. High salinity throughout the soil profile appears on about one-fourth of the locations, whereas nearly one-half of the sites are saline only in the surface (0 to 30 cm.) horizon. High salinity in the sub-soil only, shows up in but a few locations. Exchangeable sodium and relatively high pH's exist in certain soil horizons at a number of locations which may indicate trouble in leaching.

Pump out tests show good to high permeabilities below the water table at a large number of locations. During these tests, caving was frequently observed. This indicated a low soil stability.

Although the actual field work is complete with the exception of continued ground water observations, there still remains much work yet to be accomplished. There remains the office interpretation of all field data collected during the past two years. The completion of these phases of the investigation can result in providing the necessary data for designing a drainage system which could ultimately relieve the Rumaitha area of it's present drainage and salinity difficulties.

Collection and interpretation of the land classification data have been under the direct supervision of Mr. R. E. Dutton, Land Classification Advisor, USOM., Baghdad. All drainage investigations and land classification surveys have been carried on cooperatively between Mr. Dutton and myself.

It is fortunate that most of the field activities in connection with the Rumaitha studies were completed when they were. All field activities in this regard were under the direct supervision of the young American educate Iraqi engineer, mentioned earlier in this report. Soon after the Revolution, there began a constant reorganization of personnel within the Directorate, and within a few months this employee was transferred to other duties.

SHATTRA AREA

Investigations in the Shattra area were originally scheduled to begin on or about the first of January, 1957, and to be completed within two years. As of February 1957, however, the cadastral survey of the Rumaitha area had just begun. This work was started by surveyors on loan from the M.S.L.D. to

the Irrigation Directorate. These surveyors were recalled in March after having finished less than one township.

In this connection, it should be noted that the proposals for these investigations, as approved by the Board, included the following provisions:

1. To approve of Irrigation Directorate's budget and to allot an amount of ID.183,000/- debitable against Chapter I Vote 2, Art. 6F, ID.140,000/- will be spent in the financial year 1956/57, ID.48,000/- will be spent in the financial year 1957/58.

2. To authorize the Minister of Agriculture (Irrigation Directorat to spend above amounts.

3. To start a recruiting program for 1 drainage engineer with experience in drainage of irrigated lands in arid regions or with other qualifying experience of a compensating nature, and further for 20 surveyors and 10 draftsmen.

4. To authorize the Minister of Development to take all necessary actions for this recruiting program and to spend the money required for this purpose, up to a maximum of ID.1,000/- debitable against Chapter I Vote 2 Art. 6F.

In regard to items 3 and 4, it is unfortunate that the First Technical Section of the Development Board was unsuccessful in it's recruiti program. In November 1956, the Directorate, through advertisements and personal interviews received applications from a total of approximately 500 surveyors, engineers, draftsmen, overseers, etc. mostly of Indian Nationalit These applications were screened by the Directorate and a total of 40 applicants was given to the Board to assist in this program. One of the principal reasons for including the recruiting program in the proposal, was to obtain qualified surveyors. During the many meetings of the Tansiq Committee, which finally resulted in the approval of the drainage proposals, I emphasized that a properly surveyed and monumented grid system of each are to be investigated was an essential element in carrying out such investiga- tions.

As of August 1957, the Board, through it's recruitment program, had supplied the Directorate with only one surveyor. Beginning in August 1957, however, the Board was finally successful in providing the necessary number of qualified men in this field and as a result, the Rumaitha survey was completed in the latter part of 1958.

Realizing the seriousness of the above situation and the urgency of avoiding additional delays in starting the Shattra investigations, the Directorate in September, 1957, proposed to the Board that the cadastral survey of the Shattra area be accomplished by contract. The Board agreed

to this proposal and a contract was warded to the Montana Company, an Austrian Firm of consulting engineers. This firm started their work in the Shattra area on December 10, 1957 and completed the survey during July 1958, having completely surveyed and monumented the area in the same pattern as was carried out in the Rumaitha Area. The firm has also provided the Directorate with a complete set of maps of the area, showing the location of towns, villages, roads, bridges, railways, canals and laterals, drains, and other features as called for in their contract. These maps are drawn to a scale of 1:20,000 and the survey was made according to a grid system which has previously been established by the Directorate.

During February of 1959, following several reorganizations of personnel within the Directorate, the installation of ground water observation wells and the collection of soil samples for land classification purposes was inaugurated in this area. This work is still in progress. Unfortunately, however, it is being field supervised by new employees of the Directorate who are unqualified for the task. Furthermore since the latter part of 1958, it has not been advisable for point 4 technicians to travel outside of Baghdad, with the exception of one day trips only. This has resulted in our being unable to train these employees and to supervise their work. I feel quite sure that every effort is being made by these employees to "copy" the work previously accomplished in the Rumaitha area, without the benefit of Point 4 guidance. This, I think, is deliberate. I have however, made every effort to provide as much guidance as possible from my office in Baghdad. I have been told that approximately 150 observation wells have been installed in this area todate. In addition to the soil samples that are being sent to Baghdad for analysis, there are also a number of water samples being taken in this area and in the Yousifiyah area.

YOUSIFIYAH - ABU GHRAIB - LATIFIYAH AREA

Field work in connection with the location of a main drainage system for the Yousifiyah-Abu Ghraib-Latifiyah Area was undertaken by the Directorate in 1955. The total area involved amounts to approximately 500,000 mesharas.

During the early part of 1957, the Directorate submitted to the Board a plan for the proposed main drainage system. Briefly, the plan included a system to provide main drainage only for the entire area, extending from the right bank of the Abu Ghraib canal, south and east, through and including the Yousifiyah and Latifiyah areas. The plan also provided that the main drain would discharge into the Hussayib North Drain at kilometer 42. In addition to the main drain, which would have had a total length of 55 kilometers, the proposed system also included 13 branch drains. Recent studies, made since the Revolution, have led to the conclusion that the area in all probabilities will gradually change from the "Miren" system to that of intensive cultivation. If this

should occur, the drainage requirements of the area would be increased to the extent that the Mussayib North Drain would be incapable of handling the additional discharge. Studies are now being made by the Directorate to determine the feasibility of discharging these waters by pumping into the Tigris River, above the Latifiyah Area. These studies also include the possibility of utilizing the proposed Yousifiyah main drain to dispose of drainage waters from the Saklawiyah area, which at the present time are pumped into the Tigris River immediately above Baghdad.

Studies made by Mr. Dutton and myself in the Yousifiyah Abu Ghraib area were confined primarily along the alignment of the proposed main drain and to some extent in the Latifiyah area. During May and June 1956 while awaiting personnel and equipment to start the Rumaitha investigations, we personally supervised the installation of 29 ground water observation wells on a two kilometer spacing along the 55 kilometer length of the proposed main drain. These wells were drilled by a hand auger and cased with one and one-half inch galvanized pipe, the lower 18 inches of which is perforated and surrounded by a gravel pack. Depths of these wells range from two to five meters below the ground surface. Field locations and reference point elevations were obtained by field surveys.

Ground water readings were obtained from these wells in June, July, August and November of 1956 and in May, 1957. There were no indications of perched water tables, either in the irrigated or non-irrigated areas. There were likewise no indications of vertical gradients.

Water table profiles were constructed to show the position of the water table on the five occasions when readings were made. In general, the slope of the water table closely follows that of the ground surface. As would be expected under existing irrigation practices, the highest water table elevations with some exceptions, recorded during the one year period of record, were those observed in May 1957. Although no observations were made in May 1956, it is reasonable to assume that the water table at that time closely approximated that of May 1957. Throughout most of the 55 kilometer alignment of the proposed main drain, the water table declined in June, July and August of 1956. A further decline was recorded by miscellaneous readings made in November 1956. Exceptions to the normal annual fluctuation were noted in observations made at stations K3, K9, K11 and K33.

Seasonal fluctuations of considerable magnitude have been recorded along several sections of the proposed main drain. At station K3 for instance, the water table declined one and one-half meters during the period from July to August 1956. An equal decline was recorded during the period June to August 1956 at Stations K9 and K51. Seasonal fluctuations of one meter in 1956 are common along much of the alignment. Assuming that the water table in May 1956 was approximately in the same position as that recorded in May 1957, it is reasonable to believe that the normal decline between May and August ranges from one to two meters along most of the alignment of the proposed drain. Although the data collected from these wells are as yet inadequate for a detailed analysis, they strongly indicate

that the sub-surface conditions of the general area to be served by the proposed Yousifiyah Main Drain are favorable to a good natural drainage. This is further substantiated by an analysis of ground water data relative to the Latifiyah (M.S.L.D.) Project Area. In March, 1956, I constructed a water table contour map of this area showing conditions as in February. This map was prepared from ground water measurements and other data obtained from the M.S.L.D. It very clearly shows a natural ground water movement to the southeast. The contour spacing is such as to indicate a relatively good rate of ground water movement, which correlates rather closely with results of permeability measurements made by the M.S.L.D.

During the installation of the 29 observation wells along the alignment of the proposed Yousifiyah Main Drain, earth samples were collected by Mr. Dutton at each textural change throughout the soil profile for certain laboratory determinations. Similar samples were also obtained at the remaining stations not equipped with observation wells. All samples were analyzed for electrical conductivity, pH, disturbed permeability, soluble calcium and sodium, and in some cases for textural classification.

Generally speaking, the materials encountered in drilling consisted of silty clay loams, silty clays, clay loams, clays, sandy loams and fine sands. Silty clay loams and sandy loams predominate. There is very little if any horizontal continuity in lithologic characteristics. Soil samples obtained from 18 of the 55 stations were found to contain variable amounts of excess soluble salt in the top two meters of the soil profile. Exchangeable sodium was not determined. On the basis of a few analyses made on soluble calcium, there appeared to be in most cases, less sodium than calcium in the top two meters of the profile. The exchangeable sodium is therefore assumed to be relatively low, which indicates that no great difficulty would be encountered in leaching.

Thirty four of the 55 stations have soil horizons of low disturbed permeabilities two meters or more below the surface. Soil horizons at the remaining 21 stations are free of such restrictions, as likewise determined by laboratory measurements of disturbed samples. Experience in draining soils of this type, in areas of similar physical characteristics, has strongly indicated that laboratory determination of permeability on disturbed samples are subject to considerable error, and that in the majority of cases the results obtained are below true values. For this reason, field determinations of permeability were obtained at 20 stations along the proposed main drain. The saturated soil horizons at six of these stations had permeabilities of five cm. or more per hour as thereby determined, and only seven of these tested had permeabilities of less than two cm. per hour.

Values of pH for soil samples ranged from 7.3 to 8.4

In October 1953, the newly organized drainage section of the Directorate resumed studies in the Yousifiyah Abu Ghraib Latifiyah area The cadastral survey is being made by the Survey Department. This phase of the work is far behind schedule. All other work is being done by a limited number of Directorate Technicians. They plan to conduct these studies on a basis similar to those of the Rumaitha and Shattra Areas.

ISKANDERIYAH AREA

A reconnaissance investigation was partially completed in the Iskandoriyah Depression Area in late 1955 under the supervision of Mr. Dutton and myself. Although a formal report was not prepared, the results indicated a rather typical ground water depression having a north-west/south-east trend and gently dipping to the south-east, closely following the surface contours with a possible sub-surface discharge in that direction. Source of the water is primarily percolation losses from both irrigation application and surface flows following local precipitation. The data also indicated that ground water inflow from the Euphrates is a third and important contributing factor in so far as drainage is concerned. Physical conditions of the soils in the trough of the depression are such as to question the feasibility of their reclamation. If therefore appears that the most effective and feasible method for initiating drainage of the depression area would be achieved by first constructing main interceptor drains paralleling the main axis and discharging the waters to the south-east by gravity. This would eliminate the proposed pumping plant as originally planned. Discussions in this regard were held between representatives of the Directorate and the First Technical Section of the Board.

MISCELLANEOUS

Several months prior to the revolution, the Board awarded contrac for detailed drainage studies to be made on several areas originally assig to the Directorate and included in the previously mentioned Drainage propo Discussions in this regard were held between representatives of the First Technical Section and the Directorate. The area on the east or left bank of the Gharraf, containing some one million mesharas, was entrusted to the Cotha Company, a French firm of consulting engineers. The Hillah-Diwaniya Area, containing approximately one and one-half million mesharas, was entrusted to the HEDECO Company, a Dutch Firm. Both companies have recent submitted interim reports on their findings. By request of the Board and the Directorate, I have reviewed these reports and conveyed my comments to both agencies. Frankly, after many discussions with Iraqi personnel withi the Directorate and the Board, I am of the opinion that the Dutch and Fren engineers have lots to learn about reclamation in arid areas. The Iraqis agree and so do the English. This is not meant to underestimate either

the Dutch or the French. The Dutch, for instance, have a worldwide reputation for the correction of drainage problems caused by surface waters. Neither company, however, has had widespread or intensive experience in the correction of drainage problems resulting from the irrigation of lands located in arid areas. Drainage is the major problem which Iraq faces today, from the standpoint of irrigated agriculture.

In addition to organizing and directing the specific drainage studies as noted above, I have also advised the Director Generals of Irrigation on many problems relating to drainage problems in areas being studied by other agencies. I have authored several special reports not relating to drainage entirely, at the requests of several Director Generals of Irrigation. I have attended and participated in two Regional Irrigation Practices Seminars, one held in Izmir, Turkey in September of 1956 and the other in Teheran, Iran during May of 1958.

Prior to July 1958, I enjoyed my work immensely. I was always busy and received the finest of ccoperation among all the Iraqis. Since that time conditions have deteriorated, gradually, to the point that at the present time my services are no longer effective. I am of the opinion however, that the day will come when Point Four technicians will again be welcomed in Iraq.